

STRUCTURES AND METHODS FOR MAKING STRAINED MOSFETS

Abstract

A method and device providing a strained Si film with reduced defects is provided, where the strained Si film forms a fin vertically oriented on a surface of a non-conductive substrate. The strained Si film or fin may form a semiconductor channel having relatively small dimensions while also having few defects. The strained Si fin is formed by growing Si on the side of a relaxed SiGe block. A dielectric gate, such as, for example, an oxide, a high "k" material, or a combination of the two, may be formed on a surface of the strained Si film. Additionally, without substantially affecting the stress in the strained Si film, the relaxed SiGe block may be removed to allow a second gate oxide to be formed on the surface previously occupied by the relaxed SiGe block. Accordingly, a semiconductor device having a strained Si fin vertically oriented on a non-conductive substrate may be formed where the strained Si film is oriented such that it may form a channel of small dimensions allowing access to both sides and top in order to form single gate, double gate, or more gate MOSFETs and finFETs with a

channel having a reduced number of defects and/or reduced dimensions.